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09/846,096	04/30/2001	Xiang Lu	476-1998	3967

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EXAMINER	
CHAN, ALEX H	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 01/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/846,096	Applicant(s) LU ET AL.	
	Examiner Alex H Chan	Art Unit 2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 April 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1, 11 and 21-23** are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,097,696 to Doverspike.

Regarding claims 1 and 11, Doverspike discloses a wavelength division multiplexed (Col. 9, lines 32-35) optical network having nodes (10 of Fig. 2) coupled by links (32 of Fig. 2), to enable wavelengths to be routed across the network, the nodes being arranged to carry out a restoration process (via Flooding or 1+1 model, Col. 1, line 60-Col. 2, line 6 and lines 47-50) to re-route one or more of the wavelengths (Fig. 1), the restoration process having the steps of: sending messages (via TABLE 1 or TABLE 2, Col. 6, line 35-Col. 7, line 23) between the nodes to dynamically determine (via steps 50-56 of Fig. 4) possible restoration routes (Col. 7, line 51-Col. 8, line 43), and re-routing (via step 58 of Fig. 4) each wavelength along a chosen (Col. 10, lines 22-37) one of the possible restoration routes (Col. 9, line 46-Col. 10, line 21).

Regarding claim 21, Doverspike discloses all limitations as discussed in claims 1 and 11, and further discloses software for use in a node (e.g. software that drives 16, 22, and 18 of Fig. 1), the software being arranged to carry out a restoration process (e.g. software carries out a restoration process via driving the SRC (22) for setting up a restoration signal path, controller for setting the desired connection, and NMI (18) for routing restoration messages, Col. 2, lines 41-64).

Regarding claim 22, Doverspike discloses all limitation as discussed in claims 1 and 11, and further discloses a sequence of data signals (e.g. via data items of TABLE 1, TABLE 2 and TABLE 3) on a link, the data signals comprising at least some of the messages (e.g. message ID, message type, source and destination sub-network ID and error info), and signals for controlling the re-routing (e.g. via message type of cross-connect and cross-connect response, which contain sequence of new cross-connects and cross-connect map confirmation).

Regarding claim 23, Doverspike discloses all limitations as discussed in claims 1 and 11, and further discloses the steps of using the nodes to transmit the data over an original path, or following the restoration process, over a re-routed path (Col. 13, lines 50-55).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1, 11, 19 and 21-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over U.S. Pub. 2001/0038471 A1 to Agrawal et al (hereinafter Agrawal) in view of U.S. Pub. 2002/0030864 A1 to Chaudhuri et al (hereinafter Chaudhuri).

Regarding claim 19, Agrawal discloses a node for use in a wavelength division multiplexed optical network [0006] having many such nodes (nodes A-F of Fig. 1) coupled by links [0021], to enable wavelengths to be routed across the network the node being arranged to carry out a restoration process (i.e. service restoration processing) to re-route one or more of the wavelengths (e.g. via restoration path, [0051]), the restoration process having the steps of: sending messages (Fig. 3 and [0047]) between the nodes to dynamically determine possible restoration routes [0051]. Agrawal fails to disclose collecting optical parameters of each possible restoration route, and re-routing each wavelength along one of the possible restoration routes, chosen on the basis of at least the collected optical parameters, and the node being arranged to cooperate with ether nodes, and carry out the step of sending out the messages, or the step of making the choice between possible restoration routes.

Chaudhuri discloses collecting optical parameters (e.g. hop of routes (lightpath) [0046-0047] and [0106], or via wavelength assignment [0089], routing table information, channels

allocated, fiber/wavelength capacity and bandwidth capacity, [0126-0133] and [0137] or dispersion and non-linearities, [0090]) of each possible restoration route, and re-routing each wavelength along one of the possible restoration routes [0106], chosen on the basis of at least the collected optical parameters (e.g. by calculating the total restoration resources required for these routes, [0107]), and the node being arranged to cooperate with other nodes, and carry out the step of sending out the messages, or the step of making the choice between possible restoration routes ([0030], [0109] and Fig. 3). Accordingly, one of the ordinary skill in the art would have been motivated to employ the above steps to provide a system for restoration of service in the event of a failure and to efficiently restore network service by preserving bandwidth along routes [0019]. Therefore, it would have been obvious to one of artisan skill in the art to modify the fault communication for network distributed restoration by incorporating the above steps because it helps to preserve bandwidth along routes while restore network service as taught by Chaudhuri.

Regarding claims 1 and 11, the limitations introduced by claims 1 and 11 corresponds to the limitations introduced by claim 19. The treatment of claim 19 above reads on the corresponding limitations of claims 1 and 11.

Regarding claim 21, Agrawal discloses all limitations as discussed in claims 1 and 11, and further discloses software for use in a node (e.g. software that drives DNOS 506 of Fig. 5),

the software being arranged to carry out a restoration process (e.g. DNOS handles all network management including provisioning and restoration, [0029]).

Regarding claim 22, Agrawal discloses all limitation as discussed in claims 1 and 11, and further discloses a sequence of data signals (e.g. via mtPR, mtFault1, mtRestore of Fig. 1) on a link, the data signals comprising at least some of the messages, and signals for controlling the re-routing (Fig. 2).

Regarding claim 23, Agrawal discloses all limitations as discussed in claims 1 and 11, and further discloses the steps of using the nodes to transmit the data over an original path, or following the restoration process, over a re-routed path ([0025]).

5. **Claims 1-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over U.S. Patent No. 6,097,696 to Doverspike in view of U.S. Pub. 2002/0030864 A1 to Chaudhuri et al (hereinafter Chaudhuri).

Regarding claim 19, Doverspike discloses a node for use in a wavelength division multiplexed (Col. 9, lines 32-35) optical network having many such nodes (10 of Fig. 2) coupled by links (32 of Fig. 2), to enable wavelengths to be routed across the network, the nodes being arranged to carry out a restoration process (via Flooding or 1+1 model, Col. 1, line 60-Col. 2,

line 6 and lines 47-50) to re-route one or more of the wavelengths (Fig. 1), the restoration process having the steps of: sending messages (via TABLE 1 or TABLE 2, Col. 6, line 35-Col. 7, line 23) between the nodes to dynamically determine (via step 56 of Fig. 4) possible restoration routes (Col. 7, line 51-Col. 8, line 43), and re-routing (via step 58 of Fig. 4) each wavelength along (Col. 10, lines 22-37) one of the possible restoration routes (Col. 9, line 46-Col. 10, line 21). Doverpike does not explicitly disclose collecting optical parameters of each possible restoration route, chosen on the basis of at least the collected optical parameters, and the node being arranged to cooperate with ether nodes, and carry out the step of sending out the messages, or the step of making the choice between possible restoration routes.

Chaudhuri discloses collecting optical parameters (e.g. hop of routes (lightpath) [0046-0047] and [0106[, or via wavelength assignment [0089], routing table information, channels allocated, fiber/wavelength capacity and bandwidth capacity, [0126-0133] and [0137] or dispersion and non-linearities, [0090]) of each possible restoration route, and re-routing each wavelength along one of the possible restoration routes [0106], chosen on the basis of at least the collected optical parameters (e.g. by calculating the total restoration resources required for these routes, [0107]), and the node being arranged to cooperate with other nodes, and carry out the step of sending out the messages, or the step of making the choice between possible restoration routes ([0030], [0109] and Fig. 3). Accordingly, one of the ordinary skill in the art would have been motivated to employ the above steps to provide a system for restoration of service in the event of a failure and to efficiently restore network service by preserving bandwidth along routes [0019]. Therefore, it would have been obvious to one of artisan skill in the art to modify the fault

communication for network distributed restoration by incorporating the above steps because it helps to preserve bandwidth along routes while restore network service as taught by Chaudhuri.

Regarding claims 1 and 11, the limitations introduced by claims 1 and 11 corresponds to the limitations introduced by claim 19. The treatment of claim 19 above reads on the corresponding limitations of claims 1 and 11.

Regarding claims 2 and 14, Chaudhuri discloses that the nodes being arranged to make the choice of restoration route on the basis of optical parameters of the possible restoration route (e.g. lightpaths are provisioned by choosing a route through the network with sufficient available capacity and restoration is provided by reserving capacity (e.g. bandwidth) on routes [0016] with minimal hops or shorter lightpaths [0106]).

Regarding claims 3-4 and 18, Chaudhuri discloses the nodes being arranged to make the choice of restoration route additionally on the basis of optical parameters of the remainder of the path for the given wavelength (e.g. via allocating a channel for the lightpath on the downstream link and if there is no channel available on some link, then setup fails, [0077] or by storing locally extra information, [0137]).

Regarding claim 5, Chaudhuri discloses the nodes being arranged to switch traffic from one wavelength to a different wavelength, and the restoration process having the step of choosing a wavelength within that route ([0120], [0086] and [0092]).

Regarding claim 6, Doverspike discloses the nodes being arranged such that a node local to a fault makes the choice of which of the possible restoration paths to choose (e.g. via nodes' respective local SRC in finding alternate paths, Col. 11, lines 20-46 and Col. 12, lines 12-33).

Regarding claim 7, Chaudhuri discloses the nodes being arranged to reserve bandwidth on the restoration routes only after the choice from the possible restoration paths, has been made (e.g. the lightpath is established by allocating capacity on each link along the chosen route (i.e. reserving capacity after route is chosen, [0016] and page 14, claim 1).

Regarding claim 8, Chaudhuri discloses the nodes being arranged to make a separate (i.e. independent) search for possible restoration paths, for each wavelength or bands of wavelengths, to be restored (e.g. G restores broken link H-I via G-A-B-C-D whereas A restores broken link E-F via A-B-C-D independently, Fig. 3 and [0109]).

Regarding claim 9, Chaudhuri discloses the nodes being arranged to send messages along the chosen restoration path to reserve the bandwidth (e.g. restoration reservation message, [0110]), and if there is insufficient bandwidth (i.e. if no channel is available), choose another of the possible restoration routes [0077].

Regarding claim 10, Doverspike in view of Chaudhuri discloses the nodes being arranged to choose a restoration path which rejoins the original path at a node not adjacent to the fault (Fig. 3, Doverspike or Fig. 3, Chaudhuri).

Regarding claim 12, Doverspike in view of Chaudhuri discloses carrying out the steps of sending out search messages (via 52 and 54 of Fig. 4, Doverspike), or choosing between possible restoration routes (e.g. via 56 of Fig. 4, Doverspike or depending on hop or delay, Chaudhuri, [0106]).

Regarding claim 13, Doverspike in view of Chaudhuri discloses carrying out the steps of a Selector candidate, of identifying a possible restoration path (via 56 of Fig. 4, Doverspike) which bypasses ([0118], Chaudhuri) the nodes adjacent to a fault (Fig. 3, Chaudhuri), and alerting (e.g. [0102] and [0143] by alert and alarm, Chaudhuri) the node arranged to carry out the

choosing step (e.g. via nodes' respective local SRC in finding alternate paths, Col. 11, lines 20-46 and Col. 12, lines 12-33, Doverspike).

Regarding claim 15, Chaudhuri discloses the optical parameters comprising one or more selected from chromatic dispersion, polarization mode dispersion, optical signal to noise ratio, optical power loss [0090].

Regarding claim 16, Doverspike in view of Chaudhuri discloses all limitations as discussed above, and further discloses collecting the optical parameters from the nodes (via "1+1" method or "flooding" method, Col. 6, line 6 Col. 8, line 43, Doverspike or via forwarding lightpath request message to each network addressable element along selected and alternate route, page. 14, claim 1, Chaudhuri) along the possible restoration routes, to make the choice of restoration route.

Regarding claim 17, Doverspike in view of Chaudhuri discloses using the messages (e.g. via data item of TABLE 1, 2 and 3, Doverspike) additionally to carry out the collection of the optical parameters.

Regarding claim 21, Doverspike discloses all limitations as discussed in claims 1 and 11, and further discloses software for use in a node (e.g. software that drives 16, 22, and 18 of Fig. 1), the software being arranged to carry out a restoration process (e.g. software carries out a restoration process via driving the SRC (22) for setting up a restoration signal path, controller for setting the desired connection, and NMI (18) for routing restoration messages, Col. 2, lines 41-64).

Regarding claim 22, Doverspike discloses all limitation as discussed in claims 1 and 11, and further discloses a sequence of data signals (e.g. via data items of TABLE 1, TABLE 2 and TABLE 3) on a link, the data signals comprising at least some of the messages (e.g. message ID, message type, source and destination sub-network ID and error info), and signals for controlling the re-routing (e.g. via message type of cross-connect and cross-connect response, which contain sequence of new cross-connects and cross-connect map confirmation).

Regarding claim 23, Doverspike discloses all limitations as discussed in claims 1 and 11, and further discloses the steps of using the nodes to transmit the data over an original path, or following the restoration process, over a re-routed path (Col. 13, lines 50-55).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Chang et al is cited to demonstrate path selection based on bandwidth or wavelength or detected optical header signal (Fig. 5). Shew et al is cited to show independent path selection upon link failure (fig. 13) via table lookup (Fig. 11 and 12). Yoo is cited to show wavelength conversion on preferred path via checking destination with routing table (Fig. 22B-G). Venkatesan is cited to show failed node bypass (Fig. 15) via message exchange (Fig. 17-19). Shah is cited to show another link restoration method (Fig. 1 and 4). Afferton et al is cited to illustrate an OXC restoration technique (Fig. 6). Kang et al is cited to show a routing table for restoration (Fig. 2).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex H Chan whose telephone number is (703) 305-0340. The examiner can normally be reached on Monday to Friday (8am to 6pm EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Alex Chan
Patent Examiner, Art Unit 2633
December 24th, 2003

JASON CHAN
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